

Ph.D. open Seminar

Title of Thesis: **Tailoring the non-covalent assemblies of molecules: development of materials with tunable fluorescence**

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Time: **3:00 PM**

Venue: **L2**

The fluorescent molecular probes have drawn significant attention owing to their immense application in sensors, switches, and cellular and sub-cellular imaging.¹ In addition, organic solid-state emitters are of increasing interest in low-cost memory and display devices.² In this context, the basic understanding of the role of chemical bonding and molecular interactions is a prerequisite for the development of molecular materials with excellent photophysical properties and task-specific applications. Herein, we employed non-covalent self-organized assemblies using micellar and porous polymer scaffold to obtain tunable fluorescence leading to strong white-light emission in aqueous medium.^{3a,b,c} In this thesis, we also demonstrate the approach to circumvent the issue of concentration quenching of fluorescence in the solid state. An organic solid-state emitter was developed using the phenomenon of excited-state intramolecular proton transfer (ESIPT). The strategies employed are (i) steric crowding preventing π - π stacking and (ii) strong hydrogen bonding restricting intramolecular rotation. The turn on-off fluorescence upon exposure to acid /base vapour was demonstrated to fabricate rewritable and self-erasable fluorescent platform.^{3d}

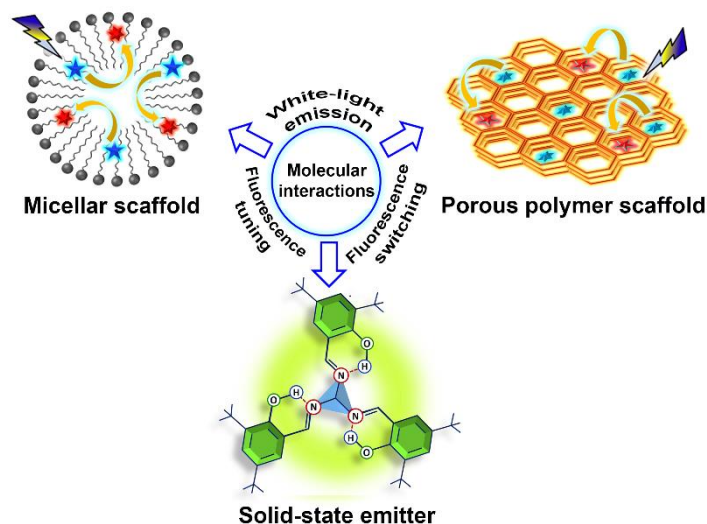


Figure: Schematic illustration depicting the role of non-covalent interactions leading to white-light emission and solid-state fluorescence.

References:

1. Zhu, H.; Fan, J.; Du, J.; Peng, X. *Acc. Chem. Res.* **2016**, *49*, 2115.
2. Sasabe, H.; Kido, J. *Chem. Mater.* **2011**, *23*, 621.
3. (a) Samala, S.; Pallavi, P.; Kumar, R.; Arigela, R. K.; Singh, G.; Ampapathi, R. S.; Priya, A.; Datta, S.; Patra, A.; Kundu B. *Chem. Eur. J.* **2014**, *20*, 14344. (b) Pallavi, P.; Sk., B.; Ahir, P.; Patra, A. *Chem. Eur. J.* **2018**, *24*, 1151, (c) Pallavi, P.; Bandyopadhyay, S.; Louis, J.; Deshmukh, A.; Patra, A. *Chem. Commun.* **2017**, *53*, 1257. (d) Pallavi, P.; Kumar, V.; Hussain, MD.; W.; Patra, A. (*Manuscript submitted*).